ELECTRONIC PERFORMANCE SUPPORT

XYBERNAUT WEARABLE COMPUTERS IN AN OPERATIONAL ENVIRONMENT

WITHOUT THE RIGHT SOFTWARE…

- TEAMED WITH MAINTENANCE MENTORING SYSTEM.
  - ELECTRONIC PERFORMANCE SUPPORT SYSTEM(EPSS) DESIGNED FOR MAINTAINERS
- NATURAL FIT
  - XYBERNAUT OPTIMIZES MOBILE COMPUTING.
  - MMS DESIGNED FOR INDEPENDENT USE ON THE FLIGHTLINE.

EPSS?

- ELECTRONIC PERFORMANCE SUPPORT SYSTEMS
  - INTEGRATED, ON-DEMAND ACCESS TO INFORMATION, ADVICE, LEARNING EXPERIENCES AND TOOLS TO ENABLE A HIGH LEVEL OF PERFORMANCE, REGARDLESS OF USER EXPERTISE.

(GLORIA GERY/BARRY RAYBOULD)

MMS?

- REPURPOSE EXISTING DATA FROM VARIOUS SOURCES INTO A FORMAT INTUITIVE TO A MAINTAINER.
- FANCY WEB SITE
  - DATABASE: XML, ACCESS, ORACLE
  - ACTIVE SERVER PAGES
  - INFO IS ACCESSED AND LINKED BASED ON USER SELECTIONS.

OUR TASK

- EVALUATE WEARABLE COMPUTING TECHNOLOGY(XYBERNAUTS) FOR EFFECTIVITY IN AN OPERATIONAL ENVIRONMENT.
- SINCE, WITHOUT THE RIGHT SOFTWARE…EVALUATE THE IMPACTS OF INCORPORATING AN EPSS IN AN OPERATIONAL ENVIRONMENT.

TECHNICAL ENVIRONMENT

- AH-1W COBRA: LEGACY,OUT-OF-PRODUCTION AIRCRAFT WITH PAPER-BASED MANUALS.
  - INCONSISTENCY IN PUBLICATION FORMATS.
  - PUBS TRANSITIONED TO PDF FORMAT AND DISTRIBUTED ON CDs
  - INCREASINGLY COMPLEX SYSTEMS WITH MINIMAL ADVANCED TRAINING FOR TECHNICIANS.

TECHNICAL ENVIRONMENT cont.

- MANDATED USE OF MANUALS AND ADHEARANCE TO PUBLISHED PROCEDURES.
- ACCESSING INFORMATION IS A SKILL IN ITSELF

PHYSICAL ENVIRONMENT

- HIGH, INCONSISTENT NOISE.
- HIGH WIND (TURNING AIRCRAFT).
- HIGH OPERATIONAL TEMPO
- LIMITED PARTS AVAILABILITY
- TYPICALLY TWO PERSON JOBS

HARDWARE OBSERVATIONS

- **CONFIGUATION IS CRITICAL**
  - **THREE OF FIVE XYBERNAUT CONFIGURATIONS REJECTED.**
  - **ONE CLEAR CHOICE IN XYBERNAUT OPTIONS**
  - **GENERALLY XYBERNAUT POUCH CONFIGURATION PREFERRED OVER PANASONIC**
  - **SENIOR TECHNICIANS TEND TO PREFER PANASONIC**
  - **JUNIOR TECHNICIANS PREFER XYBERNAUT**

HARDWARE OBSERVATIONS cont.

- XYBERNAUT SYSTEM FLEXIBILITY PROVIDES ADVANTAGE
  - SUPPORTS HUD FOR LOW LIGHT/NO WHITE LIGHT CONDITIONS
  - SUPPORTS VOICE COMMANDS
  - CONFIGURATION FLEXIBLITY BASED ON REQUIREMENT.

HARDWARE CONCLUSIONS TO-DATE

- WEARBLE COMPUTERS ARE VIABLE OPTION AND PREFERRED IN SOME SCENARIOS.
- RIGHT SOFTWARE IS CRITICAL OR HARDWARE BECOMES DETRIMENT.
- MULTIPLE CONFIGURATIONS CAN CREATE CONFUSION.
- ACCEPTANCE INCREASED WITH FAMILIARIZATION.
- TRANSITION FROM TOY TO TOOL.

EPSS OBSERVATIONS

- PDF FORMAT WHOLLY REJECTED BY JUNIORS AND SENIORS REGARDLESS OF HARDWARE USED.
  - NO FLEXIBILITY. MUST SCROLL PAGES LOOKING FOR DATA.
  - LIMITED LINKS.
  - NO MULTIPLE SCREENS.
  - ADDED COMPLEXITY AND TIME TO PERFORM.
  - HIGH FRUSTRATION LEVEL

EPSS OBSERVATIONS cont.

- ALL JUNIOR TECHNICIANS AND SOME SENIOR TECHNICIANS CLEARLY UNCOMFORTABLE WITH PAPER PUBS.
  - **LOST PLACE**
  - **SKIPPED STEPS/WRONG STEPS TAKEN.**
  - **MULTIPLE PUBLICATIONS OPEN AT ONE TIME.**
  - **MANY SENIOR TECHNICIANS REVERTED TO TROUBLESHOOTING FROM THE HIP.**
  - **FRANTIC ATMOSPERE CREATED BY SENIOR TECHNICIANS.**

EPSS OBSERVATIONS cont.

- CONFIDENCE LEVELS INCREASE IN JUNIORS AND SENIORS WHEN USING EPSS.
- 100% COMPLIANCE WITH PUBLISHED PROCEDURES WHEN USING EPSS.
- USER ACCEPTANCE OF EPSS IS FAR FASTER AND BROADER THAN EXPECTED.
- USER TRAINING TIME PROVIDED:
  - **EPSS: 30 MINUTES**
  - **PAPER PUBLICATIONS: 50+ HOURS**
- TRAINING TAKES PLACE WITH EPSS NOT WITH PAPER

EPSS OBSERVATIONS cont.

- EXPECTED CULTURAL BARRIERS AT LOWER LEVELS NOT ENCOUNTERED.
- TIME TO COMPLETION IMPROVES WITH USE.
- TWO INEXPERIENCED TECHNICIANS USING EPSS PERFORMED AT ALMOST SAME LEVEL AS TWO EXPERIENCED TECHNICIANS USING PAPER.

EPSS CONCLUSIONS TO-DATE

- MMS IS POTENTIAL FORCE MULTIPLIER.
- CLEAR USER PREFERENCE.
- EASE OF INFORMATION ACCESS REDUCES TIME.
- MMS INCREASES MENTORING AND KNOWLEDGE TRANSFER.
- DECREASED TRAINING TIME.
- JUNIORS FUNCTION AT MORE SENIOR LEVEL.

EPSS CONCLUSIONS cont.

- ACCURACY INCREASED.
  - 100% PROCEDURE COMPLIANCE.
  - INCREASED SAFETY AWAIRNESS.
  - REDUCED AD-HOC TROUBLESHOOTING.
- TECHNICIANS MORE INVOLVED IN PROCESS IMPROVEMENT.
  - COMMENTS
  - TECH PUB DEFICIENCY REPORTING

BARRIERS

- COMPETING INTERESTS CREATE DEFENSIVE ENVIRONMENT.
  - MYOPIC VIEWPOINTS
  - AMBIVILANCE
- COMPETING INITIATIVES CREATE OVERLOAD FOR SUPPORTERS.
  - JUST ANOTHER CONTRACTOR.
- CULTURAL AT MID-LEVEL (NAVAIR)

BARRIERS cont.

- LEVEL OF EFFORT DID NOT SUPPORT POTENTIAL FINDINGS.
  - RETURN ON INVESTMENT
  - BUSINESS CASE ANALYSIS
  - OVERALL LOGISTICAL IMPACT
  - READINESS?

AREAS FOR MORE RESEARCH

- MMS IMPACT ON READINESS
  - MORE SYSTEMS COVERED FOR BROADER LOOK.
  - PREVIOUS SLIDE.
- ENVIRONMENTAL IMPACTS ON HARDWARE.
- CONTINUE TO TRANSITION ADD-ONS FROM TOY TO TOOL.
- EPSS IMPACT ON TRAINING.